

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

This listing of claims will replace all prior versions and listings of claims in this application:

a.) Listing of Claims

1. (Previously presented) A network comprising:
a first network domain including a first routing device for routing network traffic out of and into the first network domain; and
a monitor/regulator, either integrally disposed in said first routing device or coupled to the first routing device to monitor the network traffic routed by said first routing device, that determines if the first network domain is sourcing undesirable network traffic, comprising a denial of service attack in which the undesirable network traffic is launched against a target network device in order to undermine the operation of that target network device by overwhelming the target network device with network traffic, out of the first network domain.
2. (Original) The network of claim 1, wherein said monitor/regulator makes said determination based on differential characteristics of network traffic routed out of said network domain, and network traffic routed into the network domain.
3. (Original) The network of claim 2, wherein said monitor/regulator infers said differential characteristics based on aggregated statistics of said network traffic routed out of said network domain, and aggregated statistics of said network traffic routed into the network domain.
4. (Original) The network of claim 2, wherein said monitor/regulator aggregates said differential characteristics based on differential characteristics between request packets routed out of said network domain, and response packets routed into the network domain.
5. (Previously presented) The network of claim 1, wherein said monitor/regulator, upon determining undesirable network traffics are being

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

sourced out of said first domain, further stops said undesirable network traffic from being sourced out of said first domain.

6. (Original) The network of claim 1, wherein
said first network domain further comprises a second routing device for routing network traffic out of and into the first network domain;
said monitor/regulator further monitors the network traffic routed by said second routing device, and determines if the first network domain is sourcing undesirable network traffic out of the first network domain based on network traffic characteristics observed of network traffic routed through said first and second routing devices.

7. (Original) The network of claim 6, wherein said monitor/regulator determines if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic characteristics observed of network traffic routed through said second as well as said first routing device.

8. (Original) The network of claim 6, wherein said monitor/regulator determines if undesirable network traffics are being routed out of said first network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.

9. (Original) The network of claim 6, wherein said monitor/regulator, upon determining undesirable network traffics are being sourced out of said first network domain, further stops said undesirable network traffic from being sourced out of said first network domain.

10. (Original) The network of claim 1, wherein
said network further comprises a second network domain including a second routing device for routing network traffic out of and into the second network domain;

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

said monitor/regulator further monitors the network traffic routed by said second routing device, and determines if at least a selected one of the first and second network domains is sourcing undesirable network traffic out of the selected one of the first and second network domains based on network traffic characteristics observed of network traffic routed through said first and second routing devices.

11. (Original) The network of claim 10, wherein said monitor/regulator determines if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic characteristics observed of network traffic routed through said second as well as said first routing device.
12. (Original) The network of claim 10, wherein said monitor/regulator determines if undesirable network traffics are being routed out of said second network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.
13. (Original) The network of claim 10, wherein said monitor/regulator, upon determining undesirable network traffics are being sourced out of at least a selected one of said first and second network domains, further stops said undesirable network traffic from being sourced out of said first and second network domains.
14. (Previously presented) A network traffic regulation method comprising:
 - monitoring network traffic routed by a first routing device of a first network domain; and
 - determining if the first network domain is sourcing undesirable network traffic, comprising a denial of service attack in which the undesirable network traffic is launched against to a target network device in order to undermine

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

the operation of that target network device by overwhelming the target network device with network traffic, out of the first network domain.

15. (Original) The method of claim 14, wherein said determining comprises determining based on differential characteristics of network traffic routed out of said network domain, and network traffic routed into the network domain.

16. (Original) The method of claim 15, wherein said determining comprises inferring said differential characteristics based on aggregated statistics of said network traffic routed out of said network domain, and aggregated statistics of said network traffic routed into the network domain.

17. (Original) The method of claim 15, wherein said determining comprises aggregating said differential characteristics based on differential characteristics between request packets routed out of said network domain, and response packets routed into the network domain.

18. (Original) The method of claim 14, wherein the method further comprises stopping undesirable network traffics from being sourced out of said first network domain.

19. (Original) The method of claim 14, wherein the method further comprises
monitoring network traffic routed by a second routing device of said first network domain; and
determining if the first network domain is sourcing undesirable network traffic out of the first network domain based on network traffic characteristics observed of network traffic routed through said first and second routing devices.

20. (Original) The method of claim 19, wherein said determining comprises determining if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

characteristics observed of network traffic routed through said second as well as said first routing device.

21. (Original) The method of claim 19, wherein said determining comprises determining if undesirable network traffics are being routed out of said first network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.

22. (Original) The method of claim 19, wherein the method further comprises stopping undesirable network traffic from being sourced out of the first network domain.

23. (Original) The method of claim 19, wherein the method further comprises determining if at least a selected one of the first and a second network domain is sourcing undesirable network traffic out of the selected one of the first and second network domains based on network traffic characteristics observed of network traffic routed through said first and second routing devices.

24. (Original) The method of claim 23, wherein said determining comprises determining if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic characteristics observed of network traffic routed through said second as well as said first routing device.

25. (Original) The method of claim 23, wherein said determining comprises determining if undesirable network traffics are being routed out of said second network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

26. (Original) The method of claim 23, wherein the method further comprises stopping undesirable network traffic from being sourced out said first and/or second network domains.

27. (Previously presented) An apparatus comprising:

- (a) storage medium having stored therein a plurality of programming instructions designed to enable the apparatus to monitor network traffic routed by a first routing device of a first network domain, and determine if the first network domain is sourcing undesirable network traffic, comprising a denial of service attack in which the undesirable network traffic is launched against to a target network device in order to undermine the operation of that target network device by overwhelming the target network device with network traffic, out of the first network domain; and
- (b) a processor coupled the storage medium to execute the programming instructions.

28. (Original) The apparatus of claim 27, wherein the programming instructions enable the apparatus to make said determination based on differential characteristics of network traffic routed out of said network domain, and network traffic routed into the network domain.

29. (Original) The apparatus of claim 28, wherein the programming instructions enable the apparatus to infer said differential characteristics based on aggregated statistics of said network traffic routed out of said network domain, and aggregated statistics of said network traffic routed into the network domain.

30. (Original) The apparatus of claim 28, wherein the programming instructions enable the apparatus to aggregate said differential characteristics based on differential characteristics between request packets routed out of said network domain, and response packets routed into the network domain.

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5USI

31. (Original) The apparatus of claim 27, wherein the programming instructions further enable the apparatus to stop undesirable network traffic from being sourced out of said first network domain.

32. (Original) The apparatus of claim 27, wherein the programming instructions enable the apparatus to monitor network traffic routed by a second routing device of said first network domain, and determine if the first network domain is sourcing undesirable network traffic out of the first network domain based on network traffic characteristics observed of network traffic routed through said first and second routing devices.

33. (Original) The apparatus of claim 32, wherein the programming instructions enable the apparatus to determine if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic characteristics observed of network traffic routed through said second as well as said first routing device.

34. (Original) The apparatus of claim 32, wherein the programming instructions enable the apparatus to determine if undesirable network traffics are being routed out of said first network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.

35. (Original) The apparatus of claim 32, wherein the programming instructions further enable the apparatus to stop undesirable network traffic from being sourced out said first network domain.

36. (Original) The apparatus of claim 27, wherein the programming instructions further enable the apparatus to determine if at least a selected one of the first and a second network domain is sourcing undesirable network traffic out of the selected one of the first and second network domains based on network traffic

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

characteristics observed of network traffic routed through said first and second routing devices.

37. (Original) The apparatus of claim 36, wherein the programming instructions enable the apparatus to determine if undesirable network traffics are being routed out of said first network domain through said first routing device based on network traffic characteristics observed of network traffic routed through said second as well as said first routing device.

38. (Original) The apparatus of claim 36, wherein the programming instructions enable the apparatus to determine if undesirable network traffics are being routed out of said second network domain through said second routing device based on network traffic characteristics observed of network traffic routed through said first as well as said second routing device.

39. (Original) The apparatus of claim 36, wherein the programming instructions further enable the apparatus to stop undesirable network traffic from being sourced out said first and/or second network domains.

40. (Previously presented) The network of claim 1, wherein said monitor/regulator monitors flows and determines whether the first network domain is sourcing undesirable network traffic based on said flows.

41. (Previously presented) The network of claim 40, wherein said monitor/regulator monitors said flows including tracking source and destination addresses and port information.

42. (Previously presented) The network of claim 1, wherein said monitor/regulator generates statistics concerning destination addresses and determines whether the first network domain is sourcing undesirable network traffic based on said statistics.

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5USI

43. (Previously presented) The network of claim 1, wherein said monitor/regulator generates statistics concerning lengths of packets and determines whether the first network domain is sourcing undesirable network traffic based on said statistics.
44. (Previously presented) The network of claim 1, wherein said monitor/regulator generates statistics concerning distributions of time to live values and determines whether the first network domain is sourcing undesirable network traffic based on said statistics.
45. (Previously presented) The network of claim 1, wherein said monitor/regulator tracks differences between outbound transmission control protocol (TCP) synchronize (SYN) and finish (FIN) packets and inbound response packets and determines whether the first network domain is sourcing undesirable network traffic based on said differences
46. (Previously presented) The network of claim 1, wherein said monitor/regulator instructs a routing device to lower a priority of the undesirable network traffic.
47. (Previously presented) The network of claim 1, wherein said monitor/regulator instructs a routing device to slow the undesirable network traffic.
48. (Previously presented) The network of claim 10, wherein said monitor/regulator, upon determining undesirable network traffics are being sourced out of at least a selected one of said first and second network domains, lower a threshold for concluding that undesirable network traffic are being sourced out of an other one of said first and second network domains.
49. (Previously presented) The method of claim 14, further comprising monitoring flows and determining whether the first network domain is sourcing undesirable network traffic based on said flows.

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

50. (Previously presented) The method of claim 49, wherein monitoring said flows includes tracking source and destination addresses and port information.

51. (Previously presented) The method of claim 14, further comprising generating statistics concerning destination addresses and determining whether the first network domain is sourcing undesirable network traffic based on said statistics.

52. (Previously presented) The method of claim 14, further comprising generating statistics concerning lengths of packets and determining whether the first network domain is sourcing undesirable network traffic based on said statistics.

53. (Previously presented) The method of claim 14, further comprising generating statistics concerning distributions of time to live values and determining whether the first network domain is sourcing undesirable network traffic based on said statistics.

54. (Previously presented) The method of claim 14, further comprising tracking differences between outbound TCP SYN and FIN packets and inbound response packets and determining whether the first network domain is sourcing undesirable network traffic based on said differences

55. (Previously presented) The method of claim 14, further comprising instructing a routing device to lower a priority of the undesirable network traffic.

56. (Previously presented) The method of claim 14, further comprising instructing a routing device to slow the undesirable network traffic.

57. (Previously presented) The method of claim 23, further comprising, upon determining undesirable network traffics are being sourced out of at least a selected one of said first and second network domains, lowering a threshold for

Application No.: 09/706,503
Amendment dated: December 20, 2005
Reply to Office Action of July 12, 2005
Attorney Docket No.: 0016.5US1

concluding that undesirable network traffic are being sourced out of an other one of said first and second network domains.

58. (currently amended) A network comprising:

a network domain which is a local area network; including

a routing device in the local area network at a boundary between the local area network and public internetworking fabric to route for routing network traffic out of and into between the network domain and the public internetworking fabric; and

a monitor/regulator, either integrally disposed in said routing device or coupled to the routing device, to monitor the network traffic routed by said routing device by analyzing flow records describing traffic conversation as indicated by a combination of source and destination addresses received from the routing device, the monitor/regulator determining that determines if the network domain is sourcing undesirable network traffic that is originating in the network domain and being routed out of the network domain by the routing device, the monitor/regulator generating statistics concerning destination addresses to determine whether the network domain is sourcing the undesirable network traffic, wherein said monitor/regulator instructs the routing device to lower a priority of the undesirable network traffic and/or slow the undesirable network traffic; wherein the undesirable network traffic comprises a denial of service attack in which the undesirable network traffic is launched against a target network device in order to undermine the operation of that target network device by overwhelming the target network device with network traffic, out of the network domain.